CHAPTER 2. ROAD TYPES & GEOMETRICS

2.01 Road Classifications

A. County roads are classified functionally as indicated in Sections 2.02, 2.03, and 2.04. Function is the controlling element for classification and shall govern right-of-way, road width and road geometrics. Other given elements such as access, arterial spacing and average daily traffic count (ADT) are typical.

B. Within each functional classification, roads are further characterized as "curb" or "shoulder" type. A "curb" type road typically requires curb and gutter with inlets and underground pipe drainage. A "shoulder" type road typically requires a shoulder and open ditch drainage.

1. Land developments in urban areas, as defined by the current King County Comprehensive Plan Map, shall provide "curb" type road improvements. Exceptions to this may be approved by the Reviewing Agency on residential access streets which are located in long-term, low density neighborhoods as designated by adopted community plans and where a pattern of "shoulder" type roads is firmly established. Exceptions for two-lot urban short plats are as allowed in Section 1.03.

2. Land developments in rural areas as defined by the current King County Comprehensive Plan Map shall provide "shoulder" typ road improvements unless otherwise approved by the Reviewing Agency. Certain exceptions to the "shoulder" type standard may apply within clustered housing developments and rural activity centers (unincorporated rural towns such as Vashon or Fall City) where urban densities and uses may make a "curb" type road appropriate. Within these developments, the specifically authorized land uses, adopted community plans or business district design guidelines may provide for either a "curb" or "shoulder" type road section.

3. Land developments in transitional areas as defined by the current King County Comprehensive Plan Map shall provide "curb" or "shoulder" type road improvements as specified by the Reviewing Agency.

4. Guidelines applicable to Rural Areas shall apply also to Resource Lands.

2.02 Arterial Roads[1] Comprising the County primary road system, see Drawings No. 1-001 and 1-002.

CLASSIFICATION		PRINCIPAL ARTERIALS		MINOR ARTERIALS		COLLECTOR ARTERIALS OR "COLLECTORS"			
FUNCTION		Inter-community highways connecting largest community centers & facilities		Intra-community highways connecting community centers and facilities.		Intra-community highways connecting residential neighborhoods with community centers & facilities.			
Access		Controlled with very restricted access to abutting properties.		Partially controlled with infrequent access to abutting properties.		Partially controlled with infrequent access to abutting properties.			
Land Use Area		**Rural**	**Urban**	**Rural**	**Urban**	----------	**Rural**	----------	**Urban**
Arterial Spacing		2 to 5 Miles	2 to 5 Miles	Under 2 Miles	Under 2 Miles	Under 2 Miles			Under 2 Miles
ADT		Over 2000	Over 2000	Over 2000	Over 2000	Over2000	400 to2000	Under400	
CRITERIA									
A. **Typical Road Type**		**Shoulder**	**Curb**	**Shoulder**	**Curb**	**Shoulder [8]**	**Shoulder [8]**	**Shoulder [8]**	**Curb [9]**
B. **Design Speed [2] (MPH)**		**Varies 40 - 60**	**Varies 40 - 60**	**Varies 35 - 55**	**Varies 35 - 55**	**Varies 40 - 50**	**Varies 35 - 50**	**Varies 35 - 50**	**Varies 35 - 50**
C. **Standard Superelevation (Ft. / Ft.)[9]**		**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**
D. **Horizontal Curvature**		**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**
E. **Maximum Grade (%) [3]**		**9**	**9**	**10**	**10**	**10**	**10**	**10**	**12**
F. **Standard Stopping Sight Distance (Ft.) [4]**		**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**
G. **Standard Entering Sight Distance (Ft.) [5]**		**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**
H. **Minimum Passing Sight Distance on 2-Lane Road. (Ft.)**		**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**	**See Table 2.1**
I. **Minimum Traveled Way (Ft.) [6]**	**2/3-Lane**	**22/34**	**44**	**22/34**	**44**	**22/34**	**22**	**22**	**36**
	4-Lane	**44**	**44**	**44**	**44**	**44**	**-**	**-**	**44**
	5-Lane	**56**	**56**	**56**	**56**	**-**	**-**	**-**	**-**
J. **Minimum Roadway Width (Ft.) [6]**	**2/3-Lane**	**38/50**	**44**	**38/50**	**44**	**38 [8]/50 [8]**	**34 [8]**	**30 [8]**	**44 [7]**
	4-Lane	**60**	**54 [7]**	**60**	**54 [7]**	**60 [8]**	**-**	**-**	**54 [7]**
	5-Lane	**72**	**66 [7]**	**72**	**66 [7]**	**-**	**-**	**-**	**-**
K. Min. **Right-of-** Way Width (Ft.)	**2/3-Lane**	100	100	84	84	60	60	60	60
	4-Lane	100	100		84	84			
	5-Lane	100	100	100	84				**84**
L. Type of Curb or Shoulder & Ditch **[6]**		**8'** Shoulder & Ditch	Vertical Curb & Gutter	8' Shoulder & Ditch	Vertical Curb & Gutter	**8'** Shoulder & Ditch **[8]**	6' Shoulder & Ditch **[8]**	**4'** Shoulder & Ditch **[8]**	Vertical Curb & Gutter

M. NOTES:

1 - Within the above **parameters,** geometric design **requirements** shall be determined for specific arterial roads consistent with the WSDOT Design Manual.

2 - Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed. Curves shall be designed within parameters of B, C, and D above. (See Section **2.05.)**

3 - Maximum grade may be exceeded for short distances. (See Section 2.1.1.**)**

4 - Standard Stopping Sight Distance (SSD) shall apply unless otherwise approved by the Engineer. (See Section 2.12.)

5 - Standard Entering Sight Distance (ESD) shall apply at intersections and driveways unless otherwise approved by the Engineer. (See Section 2.13.)

6 - Criteria for state and federal funding may require greater width. **For guardrail** installations, shoulders shall be two feet wider.

7 - Pavement width may be reduced on Urban Arterials where bikeways are not required by the Non-Motorized Plan.

8 - Rural collecton may. as alternative, have vertical curb and gutter at minimum width of 36 feet curb to curb.

9 - See Section 2.05 for allowed uses of superelevations greater than 6 percent.

2.03 Residential Access streets' Serving single-family development, see Drawings No. 1-001 through 1-006. For multiple-dwelling development, see Section 2.04.

			LOCAL ACCESS STREETS					
CLASSIFICATION	NEIGHBORHOOD COLLECTORS		SUBCOLLECTORS		SUBACCESS STREETS		MINOR ACCESS STREETS (RESIDENTIAL)	
FUNCTION	Streets connecting two or more neighborhoods and typically connecting to arterials or other neighborhood collectors.		Streets providing circulation within neighborhoods typically connecting to neighborhood collectors.		Permanent cul-de-sacs, or short loops [2], connecting to subcollectors and not supportive of through traffic.		Permanent cul-de-sacs or loops [2], with low traffic, providing circulation and access to off-street parking within residential development boundaries.	
Public or Private	Public streets		Public streets		Typically public streets For private streets (See Sec. 2.06.)		Public or private streets. (See Sec. 2.06.)	
Access	Restricted, Lots front on Local Access street where feasible.		As needed with some restrictions.		As needed with only minimal restrictions.		As needed with only minimal restrictions.	
Land Use Area	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
Sewing Potential Number of Single-Family Dwelling Units	Over 100 [3]	Over 100 [3]	100 Max.	100 Max. [4]	50 Max.	50 Max.	16 Max.	16 Max.
CRITERIA								
A. Typical Road Type	Shoulder	Curb	Shoulder	Curb	Shoulder	Curb	Shoulder	Curb
B. Design Speed [5] (MPH)	35	35	30	30	Low Speed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10
C. Max. Superelevation (Ft./Ft.)	0.06	See Sec. 2.05B	0.06	See Sec. 2.05B	See Sec. 2.05B	See Sec. 2.05B	See Sec. 2.05B	See Sec. 2.05B
D. Horizontal Curvature Min. Radius (Ft.)	See Table 2.1	See Table 2.2	See Table 2.1	See Table 2.2	Low Swed Curve See Sec. 2.10	Low Swed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10
E. Max. Grade [6]	II	12	12	15	15	15	15	15
F. Standard Stopping Sight Distance (Ft.) [7]	See Table 2.1	See Table 2.2	See Table 2.1	See Table 2.2	150 ft.	150 A.	150 A.	150 A.
ti. Standard Entering Sight Distance (Ft.) [8]	See Table 2.1	See Table 2.2						
H. Min. Pavement Width (Ft.)	22	32[9]	22	28	20	24	20[10]	22
I. Min. Roadway Width (Ft.) [11]	38	32[9]	38	28	28	24	28 [10]	22
J. Min. Right-of-way Width (Ft.)	60	56	60	48[12]	48 [12]	40[12]	48 [12]	40[12]
K. Type of Curb or Shoulder and Ditch [11]	8' Shoulder & Ditch [13]	Vertical Curb & Gutter	8' Shoulder & Ditch [13]	Vertical or Rolled Curb & Gutter	4' Shoulder & Ditch [13]	Vertical or Rolled Curb & Gutter	4' Shoulder & Ditch [13]	Vertical or Rolled Curb & Gutter
L. Min. Half St. Paved Width (Ft.)	20	20	20	20	20	20	20	20
M. Min. One-way Paved Width (Ft.)	20	20	20	20	20	20	20	20

N. NOTES:

1 - Within the above parameters, geometric design for specfic streets shall be consistent with AASHTO Policy on Geometric Design of Highways and Streets.
2 - See Section 2.15 for one-way loops.
3 - See Section 2.20 for residential access connection requirements.
4 - See Section 2.21 for urban exception criteria.
5 - Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed. Curves shall be designed within parameters of B, C and D above. (See Section 2.05)
6 - Maximum grade may be exceeded for short distances. (See Section 2.11)
7 - Standard Stopping Sight Distance (SSD) shall apply unless otherwise approved by the Engineer. (See Section 2.12)
8 - Standard Entering Sight Distance (ESD) shall apply at intersections and driveways on neighborhood collectors unless otherwise approved by the Engineer (See Section 2.13)
9 - Neighborhood collectors intersecting with arterials shall be 36 feet wide for the first 150 feet. See Section 4.05 for tapers.
10 - Exception to paving requirement on minor access shoulder type streets: (See Section 2.17)
It - For guardrail installation, shoulders shall be two feet wider.
12 - Right-of-way (or easement) may be reduced to minumum roadway width, plus sidewalks, provided that all potential sewing utilities and necessary drainage are otherwise accommodated on permanent easements within the development. (See Section 2.19)
13 - As alternative to shoulder and ditch, underground pipe drainage with either Thickened Edge. Dwg. 1-005 or Extruded Curb. Dwg. 1-006 is acceptable.

2.04 Commercial Access streets' (See Drawings No. 1-001 and 1-002.)

CLASSIFICATION	MULTIPLE-DWELLING ACCESS STREETS		BUSINESS ACCESS STREETS		INDUSTRIAL ACCESS STREETS		MINOR ACCESS STREETS (COMMERCIAL)	
FUNCTION	Local streets abutting two-family and multiple-dwelling development.		Local streets abutting dense multiple-dwelling and services, office, professional activities.		Local streets abutting manufacturing, processing, storing & handling activities.		Local streets providing circulation and access to parking and loading sites within multi-dwelling, business, and industrial development boundaries.	
Public or Private Streets	Typically public streets serving all RD and RM zones except RM 900.		Typically public streets serving RM 900 and all B (business) zones.		Typically public streets serving CG and all M Zones.		Public or private streets. (See Section 2.06.)	
Access	As needed, with some regulation.		As needed, with some regulation.		As needed, with some regulation.		As needed with only minimal restrictions.	
Land Use Area	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
CRITERIA								
A. Typical Road Type	Shoulder	Curb	Shoulder	Curb	Shoulder	Curb	Shoulder	Curb
B. Design Speed [2] (MPH)	35	35	35	35	35	35	Low Speed See Sec. 2.10	Low Speed See Sec. 2.10
C. Max.Superelevation (Ft//Ft.)	0.06	0.06	0.06	0.06	0.06	0.06		
D. Horizontal Curvature Min. Radius (Ft.) [2]	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	Low Speed Curve See Sec. 2.10	Low Speed Curve See Sec. 2.10
E. Maximum Grade (%) [3]	12	12	12	12	11	11	12	12
F. Standard Stopping Sight Distance (Ft.) [4]	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	I50	150
G. Standard Entering Sight Distance (Ft.) [5]	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	See Table 2.1	N/A	N/A
H. Min. Pavement Width (Ft.)	22	36	24	36	24	40	20	24
I. Min. Roadway Width (Ft.) [6]	38	36	40	36	40	40	28 [7]	24 [7]
J. Min. Right-of Way Width (Ft.)	60	56	60	56	60	60	48 [7]	40 [7]
K. Type of Curb or Shoulder &Ditch [6]	8' Shoulder & Ditch	Vertical Curb & Gutter	8' Shoulder & Ditch	Vertical Curb & Gutter	8' Shoulder & Ditch	Vertical Curb & Gutter	4' Shoulder & Ditch	Vertical Curb & Gutter
L. Min. Half Street Paved Width (Ft.)	20	20	20	20	20	20	20	20
M. Min. One-Way Paved Width (Ft.)	20	20	22	22	24	24	20	20

N. **NOTES:**

1 - "Commercial Access Streets" serve multiple-dwelling, business, and industrial developments. Within the above parameters, geometric design requirements shall be determined for specific streets consistent with the **WSDOT** Design Manual.

2 - Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed. Curves shall be designed within parameters of B, C, and D above. (See Section **2.05.)**

3 - Maximum grade may be exceeded for short distances. (See Section 2.11.)

4 - Standard Stopping Sight Distance (SSD) shall apply unless otherwise approved by the Engineer. (See Section 2.12.)

5 - Standard Entering Sight Distance (ESD) shall apply at intersections and driveways except on minor access streets unless otherwise approved by the Engineer. (See Section 2.13.)

6 - For guardrail installations, shoulders shall be two feet wider.

7 - Right-of-way (or easement) may be reduced to minimum roadway width, plus sidewalk, provided that potential serving utilities and necessary drainage are otherwise accomodated within permanent easements through the development. (See Section 2.19.)

2.05 Horizontal Curvature and Sight Distance Design Values

A. The design values shown in Tables 2.1 and 2.2 are minimum values necessary to meet the requirements of Sections 2.02, 2.03 and 2.04 for a selected design speed and road classification. A maximum of 8 percent superelevation may be used, upon approval of the Engineer, for design of improvements to existing arterials, as necessary, to meet terrain and right-of-way conditions. Superelevation run-off lengths on arterials, rural residential and commercial access streets shall be calculated in accordance with the WSDOT Design Manual.

B. Superelevation is not required in the design of horizontal curves on urban residential access streets; however, horizontal curves must be designed based on design speed and selected cross section as indicated in Table 2.2. Table 2.2 is based on AASHTO "Low Speed Urban Streets" design methodology. Superelevation may be used on urban residential streets as necessary to meet terrain and right-of-way conditions.

Table 2.1

Arterial Roads, Rural Residential And Commercial Access Streets
Design Values

Design Speed (mph)	30	35	40	45	50	55	60
Horizontal Curvature for 6 percent Superelevation, Radius (Ft.)	273	380	509	656	849	1,061	1,348
Horizontal Curvature for 8 percent (maximum allowable on arterials) Superelevation, Radius (Ft.) (requires approval of the Engineer)	250	350	465	600	760	960	1,200
Stopping Sight Distance (Ft.)	200	250	325	400	475	550	650
Entering Sight Distance (Ft.)	430	490	555	620	685	750	810
Passing Sight Distance (Ft.) for a 2-Lane Road	1,100	1,300	1,500	1,650	1,800	1,950	2,100

Table 2.2

Urban Residential Access Streets Design Values

Design Speed (mph)	25	30	35
Horizontal Curvature, for 6 Percent Superelevation, Radius (Ft.)	135	215	320
Horizontal Curvature, for 4 Percent Superelevation, Radius (Ft.)	145	230	345
Horizontal Curvature, for 2 Percent Superelevation, Radius (Ft.)	155	250	375
Horizontal Curvature, Normal Crown Section, Radius (Ft.)	180	300	460
Stopping Sight Distance (Ft.)	150	200	250
Entering Sight Distance (Ft.)	365	430	490
Minimum Run-Off Length (Ft.)	80	90	100

2.06 Private Streets

A. While community street requirements are usually best served by public streets, owned and maintained by the County, private streets may be appropriate for some local access streets. Usually these are minor access streets, either residential or commercial.

B. Private streets may be approved only when they are:

1. Permanently established by right-of-way, tract or easement providing legal access to each affected lot, dwelling unit, or business and sufficient to accommodate required improvements, to include provision for future use by adjacent property owners when applicable; and

2. Built to King County Road Standards, as set forth herein, or secured under the provisions of K.C.C. **19.24.040;** and

3. Accessible at all times for emergency and public service vehicle use; and

4. Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the King County Comprehensive Plan, applicable community plan, or Capital Improvement Program; and

5. Not going to result in land locking of present or future parcels; and

6. Not needed as public roads to meet the minimum road spacing requirements of these Standards; and

7. Designed to serve a maximum potential of 16 single-family dwelling units when the entire length of the private road system to the nearest public road is considered. The maximum potential is the number of dwelling units that can possibly be served by the road when physical barriers, zoning or other legal constraints are considered; and

8. Maintained by a capable and legally responsible owner or homeowners' association or other legal entity made up of all benefited property owners, under the provisions of K.C.C. 19.24.050; and

9. Clearly described on the face of the plat, short plat, or other development authorization and clearly signed at street location as a private street, for the maintenance of which King County is not responsible.

C. King County will not accept private streets for maintenance as public streets until such streets are brought into conformance with current County road standards. This requirement will include the hard surface paving of any streets originally surfaced with gravel.

D. King County will not accept private streets within short plats when the roads providing access to the plat are private and already have the potential to serve more than the number of lots specified in Section 2.06 8.7. Short plats proposed on properties to which the access is over private streets that do not meet the standards in this section shall be denied.

2.07 Half Streets. See Drawing No. 1-010

A. A half street may be permitted as an interim facility when:

1. Such street shall not serve as primary access to more than 35 dwelling units or tax lots; and

2. Such alignment is consistent with or will establish a reasonable circulation pattern; and

3. There is reasonable assurance of obtaining the prescribed additional right-of-way from the adjoining property with topography suitable for completion of a full-section road.

B. A half street shall meet the following requirements:

1. Right-of-way width of the half street shall equal at least 30 feet; and

2. If feasible, half street shall be graded consistent with locating centerline of the ultimate road section on the property line; and

3. Traveled way shall be surfaced the same as the designated road type to a width not less than 20 feet, sidewalk shall be constructed as required for the designated road type; and

4. Property line edge of street shall be finished with temporary curbing, shoulders, ditches, and/or side slopes so as to assure proper drainage, bank stability, and traffic safety; and

5. Half streets shall not intersect other half streets unless so approved by the Engineer.

C. When a half street is eventually completed to a whole street, the completing builder shall reconstruct the original half street as necessary to produce a proper full-width street of designated section.

D. The obtaining of any right-of-way or easements needed to accomplish the above shall be the responsibility of the owning builder or developer.

2.08 Cul-de-sacs and Evebrows. See Drawing No. **1-007.**

A. Whenever a cul-de-sac street serves more than six lots or extends more than **150** feet from centerline of accessing street to farthest extent of surfaced traveled way a widened "bulb" shall be constructed as follows:

1. Minimum right-of-way diameter across bulb section: **100** feet in a permanent cul-de-sac; 84 feet in a temporary cul-de-sac, with bulb area lying outside straight-street right-of-way provided as temporary easement pending forward extension of the street. Right-of-way may be reduced, provided utilities and necessary drainage are accommodated on permanent easements within the development. See Section **2.19.**

2. Minimum diameter of surfacing across bulb: **80** feet of paving in curb type road; **80** feet total in shoulder type road to include 64 feet of paving and eight-foot shoulders with compacted crushed surfacing material.

3. Cul-de-sac Island: Optional feature for any cul-de-sac when bulb paved diameter is **80** feet or less; mandatory when bulb paved diameter exceeds **80** feet. If provided, island shall have full-depth vertical curb. Minimum diameter shall be **20** feet and there shall be at least **22** feet of paved traveled way in a shoulder type section; **30** feet of paved traveled way in a curb type section around the circumference. Island shall be grassed or landscaped. It shall be maintained by the adjoining lot owners.

4. Where required on cul-de-sacs, sidewalks shall be constructed on one side and on the bulb, terminating on a property line at or near half-way around the bulb.

B. A permanent cul-de-sac shall not be longer than **600** feet measured from centerline of intersecting street to the center of the bulb section. Proposed exceptions to this rule will be considered by the Engineer based on pertinent traffic planning factors such as topography, sensitive areas and existing development. The cul-de-sac length may extend to **1,000** feet if **50** or fewer potential lots are to be served and there is provision for emergency turnaround near mid-length.

C. The Engineer or Reviewing Agency may require an off-street walk or an emergency vehicle access to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators, if the need exists.

D. If a street temporarily terminated at a property boundary serves more than six lots or is longer than 150 feet, a temporary bulb shall be constructed near the plat boundary. The paved bulb shall be 80 feet in diameter with sidewalks terminated at the point where the bulb radius begins. Removal of the temporary cul-de-sac and extension of the sidewalk shall be the responsibility of the developer who extends the road. See Drawing No. 1-008.

E. The maximum cross slope in a bulb shall not exceed 6 percent.

F. Partial bulbs or eyebrows shall have a minimum paved radius and an island configuration as shown on Drawing No. 1-009. Island shall be offset two feet from edge of traveled way.

2.09 Alleys and Private Access Tracts

A. An alley is considered a private road. Requirements of Section 2.03, subaccess streets, for horizontal curvature and stopping sight distance, apply.

1. Serves a maximum of 30 lots, with a maximum length of 400 feet; no dead ends or cul-de-sacs.

2. Minimum tract width 20 feet with a pavement surface of 18 feet (including thickened edge), based on a five-foot structure setback. For differing structure setback requirements, alley configuration shall be designated to provide for safe turning access to properties.

3. Paved surface shall have a thickened edge on one side and cross slope in one direction. See Drawing No. 1-011.

4. Public streets to which an alley connects or which provide access to the front boundary of the properties served by the alley shall be 28-foot minimum paved width with vertical curb. Alley entry shall be provided by a driveway cut.

5. Modifications to existing alleys serving commercial or industrial properties, in accordance with the above, will be determined on a case-by-case basis subject to approval by the Reviewing Agency.

B. Private access tracts shall conform to Section 2.03 for urban minor access roads and Section 2.06.

1. Serves a maximum of six parcels.

2. Minimum tract width of 26 feet with a maximum length of 150 feet, measured from centerline of intersecting street to furthest extent of paved tract.

3. Pavement width shall be a minimum of 22 feet.

2.10 Intersections and Low Speed Curves

A. Intersections

1.	Angle of intersection (measured at 10 feet beyond road classification right-of-way)	Minimum 85 degrees Maximum 95 degrees
2.	Minimum center1ine radius (2-lane)	55 Feet
3.	Minimum curb radius	
a.	Urban streets and roads classified neighborhood collector or higher	35 Feet
b.	Rural streets and roads	35 Feet
c.	Urban residential access street intersections where the highest classification involved is subcollector	25 Feet
4.	Minimum right-of-way line radius	25 Feet

B. Spacing between adjacent intersecting streets,' whether crossing or T-connecting, shall be as follows:

When highest classification involved is:	Minimum center1ine offset shall be:
Principal arterial	1,000 Feet
Minor arterial	500 Feet
Collector arterial	300 Feet
Neighborhood collector	150 Feet
Any lesser street classification	100 Feet

C. On sloping approac es at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching an arterial or 20 feet approaching a residential or commercial street, measured from future right-of-way line (extended) of intersecting street as provided in Section 2.02, 2.03 or 2.04. See Drawing No. 5-002.

D. Entering Sight Distance. See Sections 2.02, 2.03, 2.04 and 2.12 for design requirements. See Tables 2.1 or 2.2 for specific entering sight distance values based on required design speed.

E. Low Speed Curves, applicable to subaccess and minor access streets only. See Sections 2.03 and 2.04.

		Up to 75"	75" & Over
1.	Minimum centerline radius (2-lane)	100 feet	55 feet
2.	Minimum curb radius	80 feet	35 feet
3.	Minimum right-of-way line radius	70 feet	25 feet

2.11 Maximum Grade and Grade Transitions

A. Maximum grade as shown in Sections 2.02, 2.03, and 2.04 may be exceeded for short distances of 300 feet or less, upon showing that no practical alternative exists. Exceptions which exceed 15% will require verification by the Fire Marshal that additional fire protection requirements will be met. Grades exceeding 12 percent shall be paved with asphalt concrete (AC) or portland cement concrete (PCC). Any grade over 20 percent must be PCC.

B. Grade transitions shall be constructed as smooth vertical curves except in intersections where the difference in grade is one percent or less and upon approval of the Engineer or Reviewing Agency.

2.12 Stopping Sight Distance (SSD) applies to street classifications as shown in Sections 2.02, 2.03 and 2.04. See Tables 2.1 and 2.2 for specific SSD values based on required design speed.

A. Height of eye is 3.5' and height of object is 0.5'.

B. Minimum SSD for any downgrade averaging three percent or steeper as provided in Section 2.05, Tables 2.1 and 2.2 shall be increased by the values shown below for any downgrade averaging three percent or steeper (Source: AASHTO Policy on Geometric Design, Table III-2). Interpolate values for other design speeds. and grades.

SSD ADJUSTMENT VALUES (FT)

DESIGN SPEED (MPH)	DOWNGRADE 3 Percent	6 Percent	9 Percent
60	50	110	
50	30	70	
40	20	40	70
30	10	20	30
20	0	10	20

C. Sag vertical curves on subaccess and minor access streets with stopping sight distance less than that called for in Section 2.03 may be approved by the Reviewing Agency if no practical design exists and if acceptable road lighting is provided throughout the curve and is maintained by a franchised utility.

D. Intersecting Stopping Sight Distance.

1. Stopping sight distances for the design speeds of proposed commercial access streets, neighborhood collector streets and arterials must be met when intersecting arterials.

2. The minimum stopping sight distance on proposed intersection approaches for all other classifications of intersecting roadways shall be 125 feet.

2.13 Entering Sight Distance (ESD)

Entering sight distance applies on driveways and on streets approaching intersections as set forth in Sections 2.02, 2.03, and 2.04. Entering sight distance criteria will not apply on local access streets or minor access streets (commercial). Specific ESD values for required design speeds are listed in Section 2.05, Tables 2.1 and 2.2.

A. Entering vehicle eye height is 3.5 feet, measured from 10-foot back from edge of traveled way. Approaching vehicle height is 4.25 feet.

B. Requirements in Section 2.05, Tables 2.1 and 2.2 apply to an intersection or driveway approach to a typical road under average conditions. In difficult topography the Engineer may authorize a reduction in the ESD based on factors mitigating the hazard. Such factors may include an anticipated posted or average running speed less than the design speed or the provision of acceleration lanes and/or a median space allowing an intermediate stop by an approaching vehicle making a left turn.

C. Where a significant number of trucks will be using the approach road, the Engineer may increase the entering sight distance requirements by up to 30 percent for single-unit trucks and 70 percent for semi-trailer combinations.

2.14 Medians (Optional Design Feature)

Median width shall be additional to, not part of, the specified width of traveled way. Edges shall be similar to outer road edges: either extruded or formed vertical curb; or shoulder and ditch; except that median shoulders shall be minimum four feet in width. Twenty feet of driveable surface (which includes traveled way and paved shoulders, if any) shall be provided on either side of the median. Median may be grassed, landscaped, or surfaced with aggregate or pavement. Median shall be designed so as not to limit turning radii or sight distance at intersections. No portion of a side street median may extend into the right-of-way for an arterial street. The Engineer may require revisions to medians as necessary to provide for new access points and to maintain required sight distance. Non-yielding or non-breakaway structures shall not be installed in medians. Street trees may be planted in median subject to approval by the Engineer.

2.15 One-Way Streets

Local access streets, including loops, may be designated one-way upon a finding by the Engineer that topography or other site features make two-way traffic impractical.

2.16 Bus Zones and Turn-Outs

During the design of arterials and neighborhood collectors, the designer shall contact Metro Service Planning, phone 684-1622 and the local school district to determine bus zone (stop) locations and other bus operation needs. The road project shall provide wheel chair accessible landing pads at designated bus zones as per Section 3.02 of the Standards and where required shall include turn-outs and shelter pads, Pedestrian and handicapped access improvements within the right-of-way to and from the bus loading zone or turn-out from nearby businesses or residences shall also be provided as part of the road improvement. Surfacing requirements may also be affected, particularly on shoulders. See Section 4.01B of the Standards. Metro's publication, "Metro Transportation Facility Design Guidelines," is applicable.

2.17 Exception to Paving on Rural Minor Access Streets (Residential)

A. A rural minor access street (residential) as described in Section 2.03 that is a private street shall meet the following standard: It shall be graded and, as minimum treatment, be surfaced full width including shoulders (28 feet) with crushed surfacing material as provided in Section 4.01A Alternative V and Drawing No. 1-004. Half streets shall be surfaced not less than 20 feet wide. Where connecting to a public street the connecting area shall be paved between traveled way and right-of-way line (extended) of the public street, with 25 foot or 35 foot radii as required by Section 2.10. Paving shall be in accordance with Section 4.01A with applicable alternative other than Alternative V.

B. Any rural minor access street (residential) approved under subsection A above shall remain a private street unless it is upgraded to public street standards at the expense of the subdivider or adjoining lot owners, to include hard surface paving, and accepted by the Engineer for public ownership and maintenance.

2.18 Intersections with State or Federal Highways

In the event that the County has jurisdiction on a development that requires the construction or improvement of a commercial/industrial driveway or any classification of street that intersects a state or federal highway, minimum 'intersection spacing, entering sight distance and landing requirements in accordance with these Standards shall be satisfied in addition to the requirements of all other applicable permits. In the instance State or Federal standards exceed these Standards, State or Federal standards shall govern.

2.19 Slope, Wall, & Drainase Easements and Risht-of-Way Reduction

A. Easements

Either the functional classification or particular design features of a road may necessitate slope, sight distance, wall or drainage easements beyond the right-of-way line. Such easements may be required by the Engineer or Reviewing Agency in conjunction with dedication or acquisition of right-of-way.

B. Right-of-way reduction on subcollectors, local access (residential) and minor access (commercial)

In proposed developments served by underground utilities within easements, the right-of-way may be reduced to the minimum roadway width plus sidewalk, as allowed in Sections 2.03 and 2.04, with the approval of the Reviewing Agency. Where it is desired to reduce right-of-way to a minimum width, the right-of-way, plus easement, shall allow for construction and maintenance of the following as appropriate, sidewalks, planter strips, drainage facilities, sign placement, and also allow sidewalk widening around mailbox locations. On subcollectors, installation of fixed objects, other than required above ground utility structures, greater than four inches in diameter within four feet of back of sidewalk shall not be permitted.

2.20 Access and Circulation Reauirements

In order to provide a second access to a residential subdivision, short subdivision, binding site plan or planned unit development, no residential street shall serve more than 100 lots or dwelling units unless the street is connected in at least two locations with another street that functions at a level consistent with Sections 2.02 and 2.03.

A. The second access requirement ***may*** be satisfied through use of connecting a new street to an existing street in an adjacent neighborhood **if**:

1. No other practical alternative exists, or

2. Existing street was previously stubbed indicating intent for future access, or

3. An easement has been recorded specifically for said purpose.

The second access requirement **may not** be satisfied through use of an existing roadway network in the existing adjacent neighborhood **if**:

1. A more practical alternative exists, or

2. **Existing streets do not meet Section 2.03**

These provisions are not intended to preclude the state statute on land-locking.

B. This section does not preclude a commercial project from gaining access through a residential development. Traffic impacts for such projects will be analyzed during the SEPA process.

2.21 Exception for Maximum Dwelling Units on Urban Subcollectors

Proposed subcollectors serving new urban area developments with an average density of seven to eight dwelling units per acre and which meet the access requirements of Section **2.20** may serve up to **250** single-family dwelling units, if approved by the Reviewing Agency. Prior to approval, the Reviewing Agency may require a traffic circulation study showing a balanced traffic flow of less than **1500** vehicles per day past any access point. Street trees shall be mandatory along subcollectors serving higher densities of seven to eight dwelling units per acre and shall be in conformance with Section **5.03.**